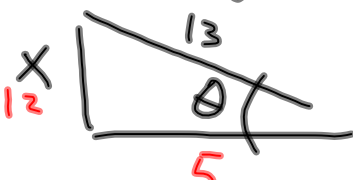


partition

25.  $[w, v] \quad [x_0, x_1 \dots x_n]$

$$\lim_{k \rightarrow \infty} \sum_{j=1}^k \frac{1}{\sqrt{x_j}} \Delta x = \int \frac{1}{\sqrt{x}} dx$$

23.  $\frac{d\theta}{dt} = 2$        $\frac{dx}{dt} = ?$       when  $x = 12$



$\sin \theta = \frac{x}{13}$        $x = 13 \sin \theta$

$$\frac{dx}{dt} = 13 \cos \theta \frac{d\theta}{dt}$$

$$= 13 \left( \frac{5}{13} \right) \cdot 2$$

$\cos \theta = \frac{5}{13}$

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15.  $x = 2 \sin t$        $y = 3 \cos t$        $[0, \frac{\pi}{2}]$

$$\int_a^b \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2} dt$$

$$\int_0^{\frac{\pi}{2}} \sqrt{(2 \cos t)^2 + (-3 \sin t)^2} dt$$

$$\int_0^{\frac{\pi}{2}} \sqrt{4 \cos^2 t + 9 \sin^2 t} dt$$

$\cos^2 + \sin^2 = 1$

$\cos^2 = 1 - \sin^2$

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Review 10

rel. extrema (max, min)

1<sup>st</sup> der test - sign graph with sentencemax:  $f'$ :  $+ 0 -$   $f'$  changes from  $+$  to  $-$   
 $+ \times -$ min:  $f'$ :  $- 0 +$   $f'$  changes from  $-$  to  $+$   
 $- \times +$ 2<sup>nd</sup> der test max  $f'' < 0$  min  $f'' > 0$  

check endpoints if closed interval

abs max or abs min  
candidates

1.  $f'(c) = 0$

2.  $f'(c) = \times$

3. endpoints  $x=a$   
 $x=b$

$f(c)$

$f(c)$

$f(a)$

$f(b)$

look of  
biggest/smallest

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Find the abs max of  $f(x) = \frac{1}{3}x^3 - 4x$   
on the interval  $[-1, 4]$  no calc!

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vector functions

position  $\hat{r}(t) = \langle x(t), y(t) \rangle$

velocity  $\hat{v}(t) = \langle x'(t), y'(t) \rangle$

acceleration  $\hat{a}(t) = \langle x''(t), y''(t) \rangle$

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position  $\hat{r}(t) = \left\langle \int_a^b x'(t) dt + x_0, \int_a^b y'(t) dt + y_0 \right\rangle$

speed  $|\hat{v}| = \sqrt{(x'(t))^2 + (y'(t))^2}$

distance  
(arc length)  $= \int_a^b \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2} dt$

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